Value of Solar – 3rd Stakeholder Meeting
Xcel Energy Presentation

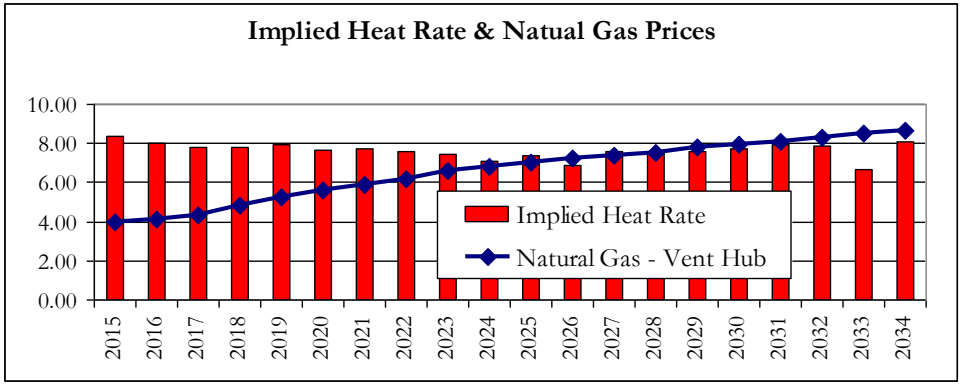
October 15, 2013

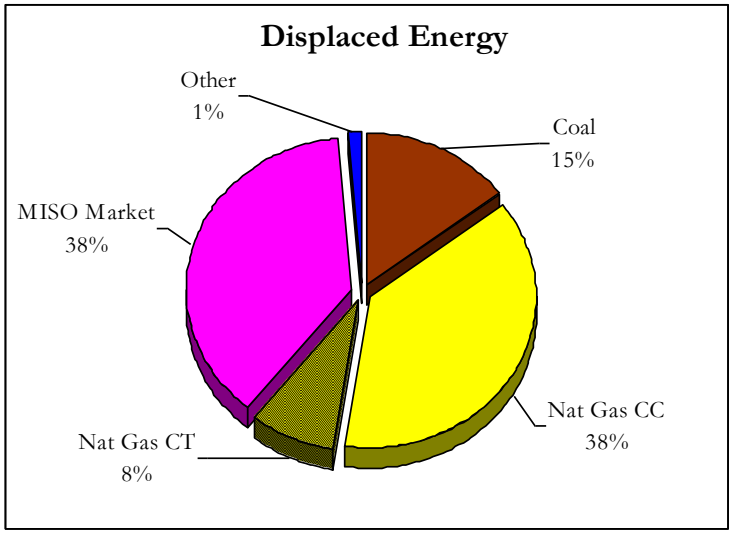
Guiding Principles

- **Maximize Value for all Customers**
- **Known and Measurable Components**
- **Transparency and Separation of Incentives**
- **Establish Proper Price Signals**

Avoided Energy and O&M Costs

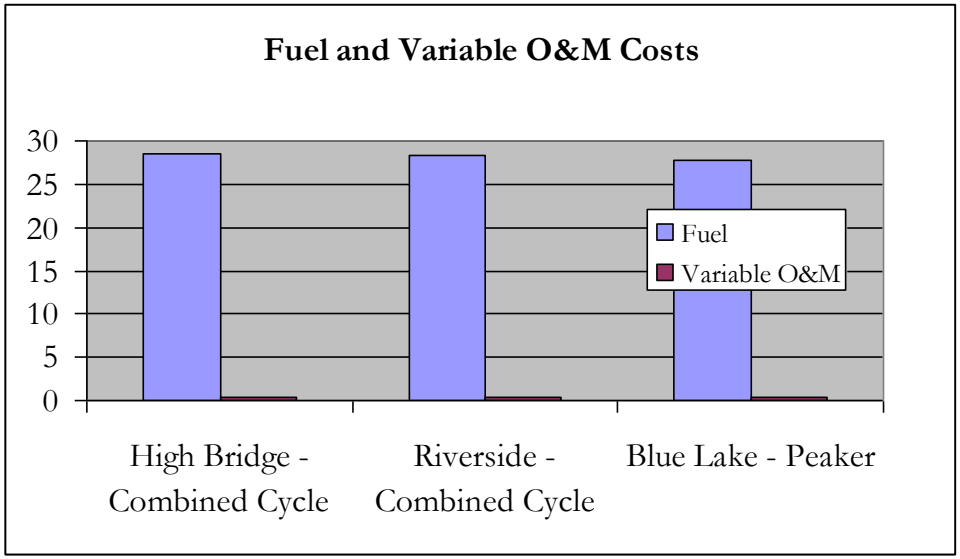
- Gas price assumptions
- Implied heat rate model results
- Displaced generation





Avoided Energy and O&M Costs, cont.

- Estimated solar through 2020:
  - 100 MW
- Avoided O&M small part of overall value
- Overall avoided energy cost estimate:
  - $0.046 kW/h
  - Includes fuel and O&M
  - 20 year term



Avoided Generation & Reserve Capacity Costs

- Assumptions
  - $5/kw-month cost of capacity
  - No capacity need until 2017-2024 time frame
- Capacity credit
  - 42%, based on Effective Load Carrying Capacity Study
- Estimated range for Avoided Generation Capacity Cost:
  - $0.006 to $0.013/kWh
  - Range dependant on year capacity is added (2017-2024)

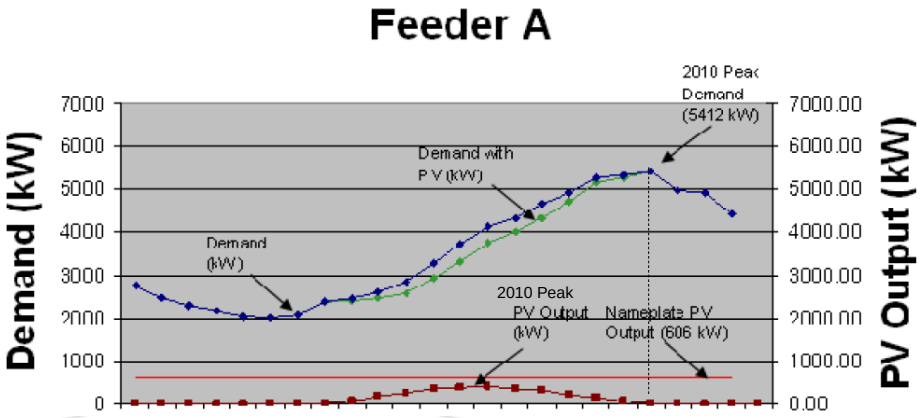
- Avoided Reserve Capacity
  - Total solar capacity (MW AC) X* % Accreditation Factor *X (1 + Reserve Margin%)
- Estimated Avoided Reserve Capacity Cost:
  - $0.0004/kWh

Avoided Transmission Capacity Costs

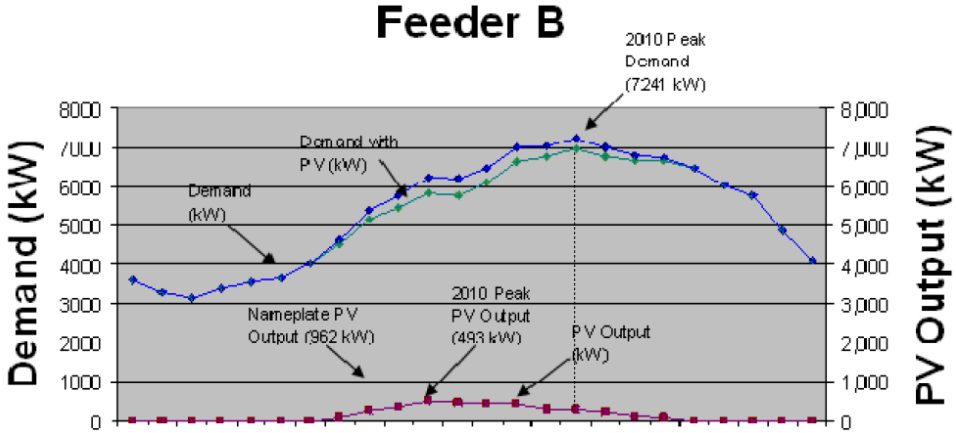
- Avoided transmission capacity tied to avoided need for additional generation
  - Small impact
  - Interconnection costs are zero until new power plant is added
- Estimated Avoided Transmission Capacity Cost:
  - $0.0001/kWh

Avoided Distribution Capacity

- Peak demand on residential distribution system has a low correlation to solar PV generation peak
- PV provides little distribution capacity benefit during peak hours
- High penetration feeders may require additional modifications
- Estimated Avoided Distribution Capacity range: $0 to $0.0005/kWh



Residential Feeder (403 kW PV)



Commercial Feeder (493 kW PV)

Line Losses – Transmission & Distribution

- Should study both margin and average energy losses
  - Look at solar load and line losses for every hour of the year
- Setting line losses at a peak demand losses rate would overvalue line losses for the following reasons:
  - Loss rates may be significantly lower in non-peak hours
  - Winter loss rates likely lower than Summer loss rates
- Estimated Avoided Line Losses: $0.004/kWh
  - Based on 7% average line losses

Fuel Price Guarantee

- Hedging assumptions should reflect utility hedging strategy
- Company does not engage in financial fuel hedging activities
- Does not incur fuel hedging costs
- No quantifiable benefits
- Not recommended for inclusion in VOS
- Non-solar customers still deal with price volatility
- Solar customers retain hedge

Incremental Cost of Solar Penetration

- Solar Integration
  - Wind Integration costs are considered today
  - Consider study as penetration levels increase
  - Estimated Solar Integration Cost: $0.001/kWh

Environmental Value

- Today environmental impact is consideration in resource selection process
  - Resources also evaluated under $0 cost assumption
  - Environmental costs not included in rate impact analysis
  - Recommend using $0/ton
- Should an environmental value be included, we recommend the value be no larger than what has already been approved by the Commission
  - Should reflect future cost of compliance
- As the market for carbon develops, we recommend including actual market prices in the value of solar
- Customers paid for environmental hedging value in VOS should be subject to future carbon risks
- Estimated Avoided Environmental Cost Range: $0 to $0.025kWh

Other VOS Component Values

Recommended not to be included in VOS methodology:

- Distribution Specific Location Value
- Voltage Control
- Local Manufacturer or Assembly Value
- Market Price Reduction
- Disaster Recovery

Preliminary VOS Rate Component Summary

VOS Category	Preliminary Avoided Cost per kWh
Fuel Cost	$0.0450
Plant O&M	$0.0010
Generation & Reserve Capacity	$0.0064 – $0.0134
Transmission Capacity	$0.0001
Distribution Capacity	$0.0000 – $0.0005
Line Losses	$0.0040
Environmental Benefits	$0.0000 – $0.0250
Fuel Price Guarantee	$0.0000
Other Benefits	$0.0000
Other Costs	($0.0010)
Total Avoided Cost	**$0.0555 – $0.0880**

- Ensure VOS is consistent customer retail rates
- VOS should be equitable for all customers
  - Based on clearly identified avoided costs and benefits
  - Policy incentives should be clearly identified
- Central solar systems:
  - Same environmental benefit at lower cost